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Improved Bank Lock.

The art of constructing locks, and particularly those designed for the protection of extremely valuable property, as the locks of banks and safes, has advanced rapidly, and is yet advancing with very rapid strides. Almost every new invention in this line is, after a few years or months, proved to be vulnerable either to delicately sensitive and accomplished fingers, or to the more violent action of drills and gunpowder. The lock now about to be presented is claimed to be absolutely proof to all the yet known means of opening, except by the proper key. The lock is permutating or changeable, as is the case with all good locks at the present day, so that by a change of the position of the bits in the key (which can be effected by the owner in a few seconds), the lock is rendered proof against even the mechanic who manufactured and affixed it.

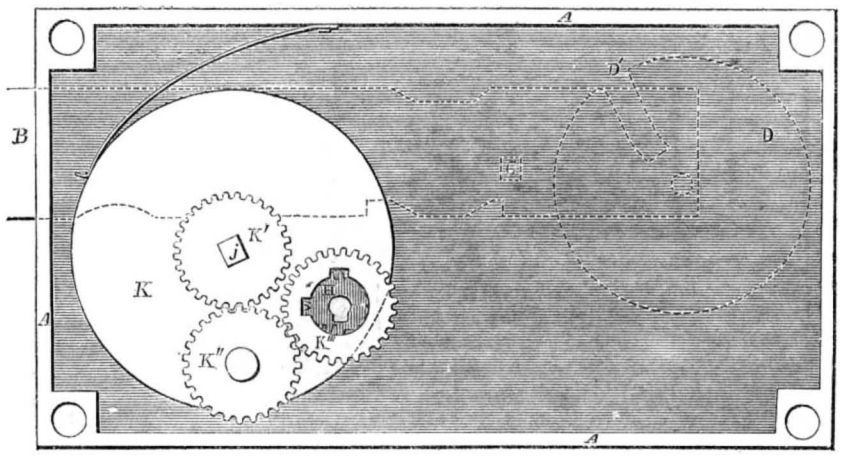
The inventor is Dr. H. Isham, of New Britain, Conn. He has studied the subject some twelve years as an amateur, and is familiar with all the locks now in use, either in this country or Europe. The lock as here represented contains eight tumblers, and is of about the ordinary size of the most approved locks.

The key hole is round. The bits, eight in number, are each portions of gear wheels, and are mounted in a pod which is so attached to the stout shank of the key, that it is readily separable. The bits alone are ordinarily carried in the pocket of the cashier, while the stump or stout handle may be left in any convenient place near the lock.

In the process either of locking or unlocking, the pod of bits is disconnected from the stump, and a stout plate of chilled iron or steel cuts off all communication therewith from the exterior. The bits are rotated by the aid of a train of gearing which gearing is worked by revolving the stump in the front part of the lock. The bolt is also thrown by the same agency. There are features in this lock which differ materially from any other, one of which is the fact that all the tumblers are traversed to the full extent every time the parts are locked or unlocked, so that the ordinary means of smoking and the like are ineffectual in furnishing indications of the form of bits required. This arrangement constitutes a feature of no ordinary merit, and gives this lock immense advantages over any other.

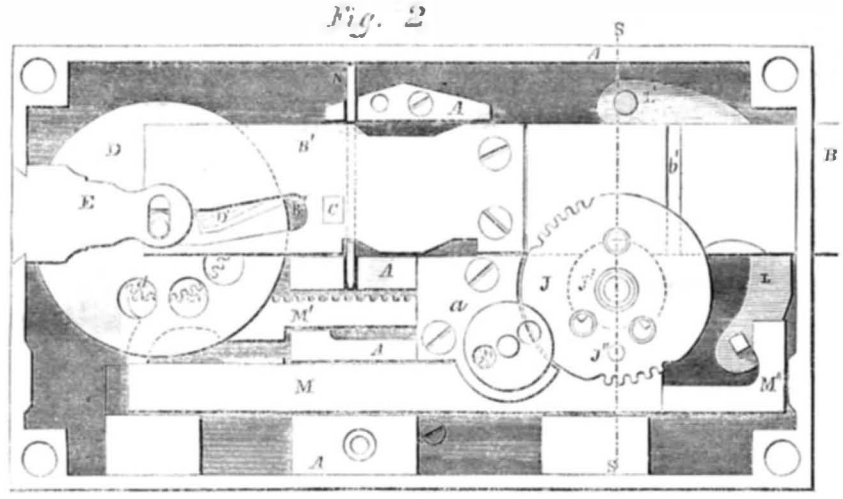
It is stated by the inventor that "there is not a lock in use that will not show the shape of its key worn distinctly upon the moving parts of the lock, especially if the same form of key is used for a considerable time; so that a person having access to the lock when it is unlocked, can determine the shape of the key from the marks inside." If locks were correct in principle, such would not be the case, and this fact makes it necessary that locks now in popular use, should be made light and delicate, and of inferior capacity; for if they had tumblers that moved inches instead of eighths of inches, they could be picked; or if they were made to move more easily, and made strong and large, they could not be protected against pressure or marking. In other words when they are not light and of small capacity they are liable to be picked—when they are *comparitively* safe, they get out of order. These facts can be demonstrated.

ISHAM'S BANK LOCK.



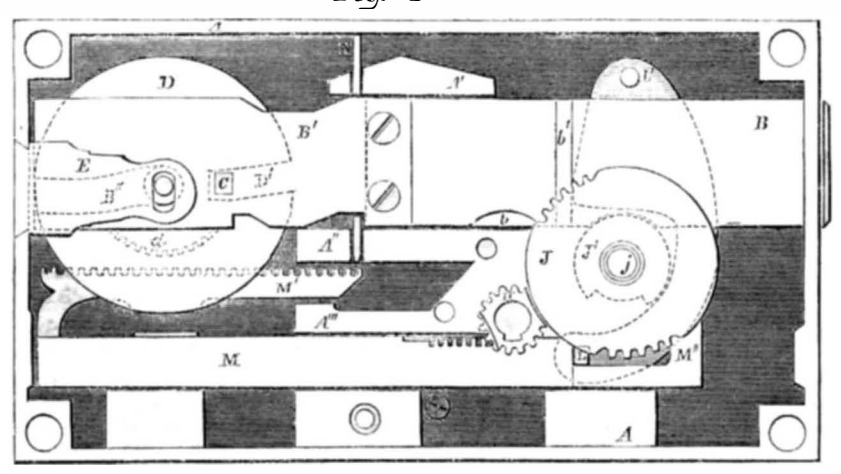
He claims also, that his gear and pinion lock cannot receive upon its moving parts any particular impression—that the same form or arrangement of the bits of the key can be used for ten years, without giving the slightest indication of the shape of the key, in the wear of the lock inside. Not a mark appears different from what it would have been, if the key had been changed a thousand times.

Fig. 2



He claims that the lock is not hollow, like other key hole locks. The key does not pass through the front plate of the lock, but the key hole is partitioned from the inside, by a wall of solid metal thicker than the plate of the lock, shutting out all communication with the interior, beyond the middle partition.

Fig. 3



The key hole, which is cylindrical, opens into the safe or vault, and is thus secure from the operation of gunpowder. If this key hole was six feet in diameter and the work made strong in proportion, the lock would be more secure against picking, instead of being less secure, like other locks.

He claims it is safe against picking by pressure or feeling, for two reasons. First, any attempt made to move the bolt locks the tumblers so that they cannot be adjusted to receive the bolt; and any attempt to move the tumblers when the bolt is fastened, is to no purpose. Second, neither the tumblers nor the bolt can be moved except when the key hole is covered and all communication with the interior cut off. It is safe from marking or measuring, for two reasons also. First, the moving parts of the lock move to the same extent, whatever the form of the key, so that not one of the numerous changes of which the key is susceptible, leaves any mark or impression upon the inside of the lock, corresponding to the shape of the key. Second, when the key hole is open there is no part of the lock that can be moved in any way. The interior of the lock cannot be reached by picks, as there is no access to or communication with it through the key hole.

The moving parts are strong, and move more by actual contact, without springs or dependence upon friction, than any other lock.

Being correct in principle, it can be made large or small with the same security and practicability. This covers the whole ground, and makes it absolutely necessary to employ the same key in unlocking that was used in locking it."

The front of the lock consists of two plates, the innermost of which is cast with the frame, and the outermost is affixed by screws. Between these exists a space of sufficient thickness to allow for the stout cut-off disc and gear referred to. The movement of the tumblers in the interior of the lock, is effected entirely This covers the whole ground

Fig. 1 is a front view of the lock, with the outer plate removed. Figs. 2 and 3 are rear views, with the back plate removed; Fig. 2 showing the bolt thrown out, and Fig. 3 the same with the bolt drawn in. Fig. 4 is a transverse section of the lock, and Fig. 5 a side view of the key and bits slightly separated. Fig. 6 gives an end view of one of the bits, and also a similar view of the end of the core on which the bits are mounted.

A is the case or frame, A′ the front plate, and A″ the back plate. B is the bolt, and B′ stout plates screwed on B, which form an extension of the same. B″ is a split or deep notch in the end of the extensions B′, made in the form represented. *b b* are notches on the under side of B, and *b′* is a vertical groove across the face of B. C is a stout crossbar between the two plates B′ B′, and fixed to each. This is is what is termed, by lock makers, the "fence," and which, by meeting the circular tumblers D, forms one of the chief difficulties in forcing back the bolt B by any improper means. D represents a nest of circular tumblers capable of revolving separately on the bolt which forms their center. D′ represents a deep notch in theform represented, and *d* represent smaller gear wheels, one of which is attached to each of the tumblers D. E is a slotted support for the shaft of D, and which allows the shaft, and consequently all the tumblers D, with the gears *d*, to rise and fall to a limited extent, by the contact of the edges of the crooked notch B″, as the bolt B is thrown out or in. F is the stump or shank of the key. F′ is a stout horn or projection thereon, by the aid of which all the mechanism of the lock is worked. G is the core of the bits, G′ is a horn or projection on G, and G″ the bits which are changeable in position. H is a small gear wheel mounted in the lock to receive the end of G, with its horn G.′ This gear wheel H does not, as might at first be supposed, *receive* motion from the pod of bits, but on the contrary serves to convey motion thereto.

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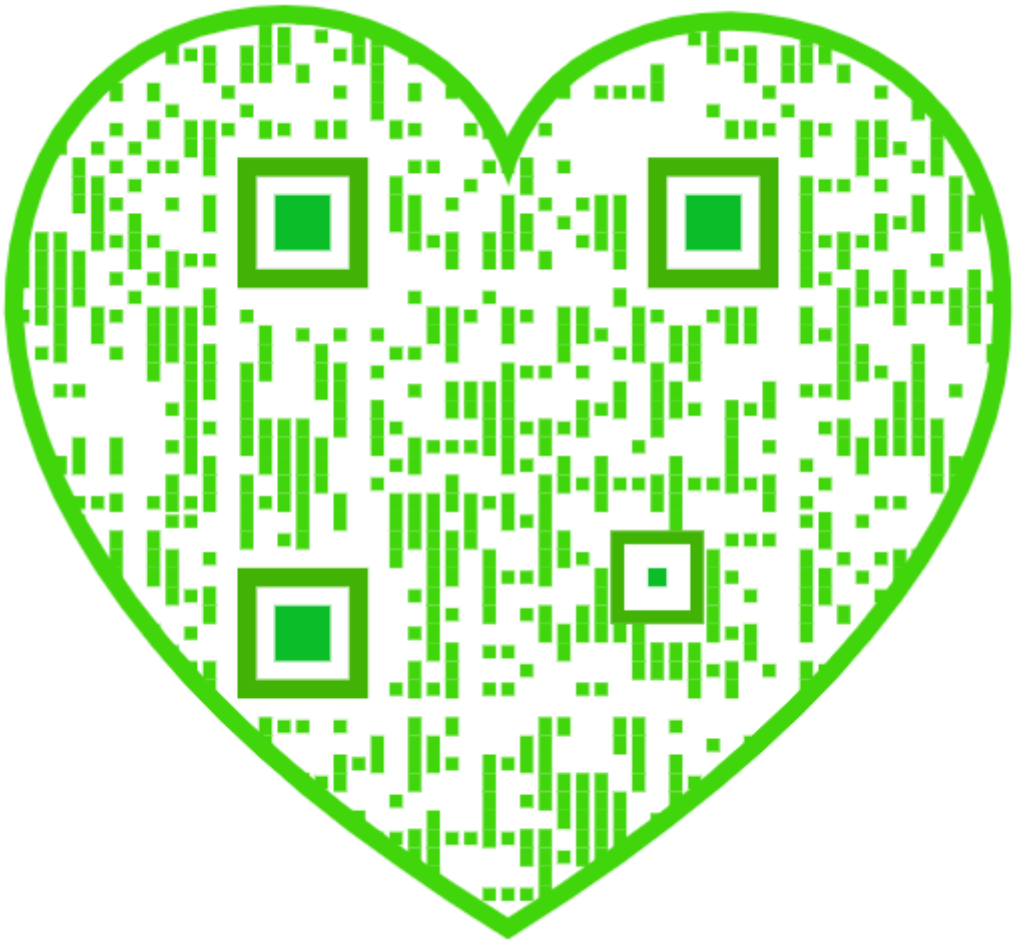
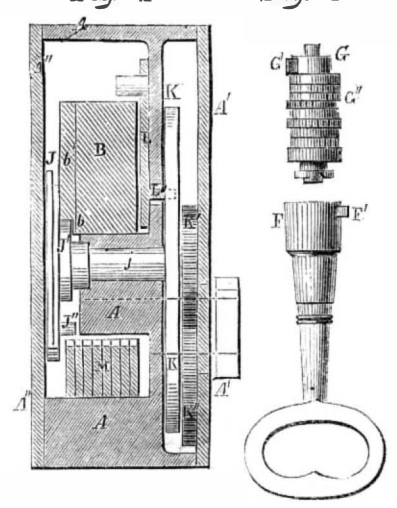


K‴ is the first gear wheel, which is mounted in such manner as to surround the key hole, and receives motion from the revolution of the stump of the key. K″ is the second gear wheel, which receives motion from K‴, and conveys it to K′ This third gear wheel K′, is fixed on the shaft *j*, which passes through the inner front plate of the lock, and conveys the motion to the mechanism within. J′ is a cam or heart-shaped wheel, fixed on *j*, and which, in addition to the fence C and fence tumblers D, prevents the bolt from being moved in either direction except at the right moment. J″ is a stout pin projecting from J, and which, by catching in the groove

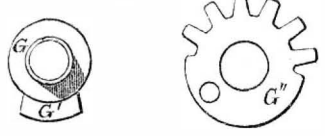
Fig. 4 *Fig. 5*



b as it rotates, is the medium by which the bolt is thrown. K is a stout disc or wheel of chilled iron or hardened steel fixed on the same shaft *j*, so that it revolves therewith. There is one hole only in K, and this coincides with the key hole when the bolt is fully thrown in either direction, and in that condition of the lock allows the key to be inserted or removed, but in all intermediate conditions it completely stops the passage, isolating the pod of bits from the stump F.

L is a lever mounted on the center L′. It receives motion from K through the agency of the pin L″, Fig. 4, which projects through from L to a curved slot in A. It is so operated on by a stop or projection on K, that when the wheel K is revolved in one direction to throw the bolt B outward, it compels the lever

Fig. 6



or dog L to assume the position shown in Fig. 2 and when revolved in the opposite direction compels it to assume that shown in Fig. 3. This prevents any motion of the tumblers M except while K is partly revolved, and consequently the key hole is entirely stopped. M′ are thin racks corresponding in thickness with the gear wheels *d*. They are fixed to the racked tumblers or sliders M as represented, which latter receive motion from the rotation of the key bits G″. M″ are simply the bent extremities of M′. Their office is to receive the dog L and prevent the motion of M′ except at the proper time. N is a knife stop operated by the inclined upper and lower edges of B′, as represented, and which, by catching in the teeth of M′, prevents the parts from moving by any force while the bolt B is being thrown.

Operation.—The bits G‴ are all firmly secured by simple means on the core G. The whole is fitted by a spring catch to the stump F in such manner that it can be readily disconnected by giving a quarter revolution thereto. In locking, the key is inserted freely into the key hole to the full depth, so that the bits G″ are each over one of the sliders M, and the horn G′ is inserted in a corresponding cavity in the small gear wheel H. The stump F is now turned a quarter revolution, which disconnects it from the bits, and allows it to be drawn outwards sufficiently to be entirely clear of the cut-off plate K. The stump K is now rotated, thereby giving motion by means of the gear wheels K‴, K″. K′, to the shaft *j* with all its attachments. The plate J revolves idly until the key hole is covered or for about a quarter of a revolution, and then commences to rotate the gear wheel H, which receives or has received the G or G′ end of the pod of bits, and commences to turn the bits G″, and to move the sliders M; but as the bits G″ are each carried only a half of a revolution, and the gears do not coincide each with the other, it follows that the said sliders M are moved to unequal extents. After the gear wheel H, and consequently the bits G″, have performed half a revolution, their motion ceases for a time, and the wheel J continues to revolve. Meanwhile the cam J′ has released the bolt B and the pin J″ catching in the groove, *b* commences to throw the bolt B outward. As this movement progresses, the nest of tumblers D is depressed, and the gears *d* are made to lock into the racks M′, a connection which they are to maintain until the bolt B is again thrown back to its first position. The continued revolution of J finally gives the remaining half revolution to the small gear wheel H, and consequently to the key bits G″, which moves each of the sliders M the remainder of its motion, and leaves them altogether in the position shown in Fig. 2; the bolt B having previously moved outward so far as to take the fence C entirely out of the notches D, in the circular tumblers D, and allows these circular tumblers to be each partially rotated according to the irregular position of the bits G″. The locking is now complete, and the cam J′ is again in such position in the notch *b* that it aids the fence C in preventing any throwing in of the bolt B by any violence. The stump F is now thrust inward (the cut-off plate K having made a complete revolution,) the connection with the bits is again made by the spring catch, and the whole is removed.

The unlocking consists in a repetition of this process performed in the reverse direction, *with the bits G″ in precisely the same relative position.* Any change of these parts, or the introduction of bits faulty in any respect, will fail to adjust the tumblers D in precisely the position they were in at first, and if one only of these be rotated too far, or not far enough to cause their notches D′ to coincide exactly with the motion of the fence C, the unlocking cannot be performed. These tumblers D are not accessible by any known means, except through the means described.

For any information, please address Dr. H. Isham, New Britain, Conn., or James Talcott Esq., 57 Liberty street, New York.

Coal.

As a kind of answer to the question "What is it?" published by us last week, we transcribe the following description by J. A. Phillips, an English metallurgical chemist:—

Lignite, or brown coal, is found in that portion of the earth's crust called by geologists the "tertiary formation," and it varies very much in its appearance and composition, and has consequently received from mineralogists several distinct names, such as brown coal, bituminous wood, common lignite, and earthy lignite. Of these, the former very much resembles turf in its nature, consisting of woody matter, which in many instances so far retains its original structure as to admit of the recognition of the class to which the tree belonged. This kind frequently loses about twenty per cent of water at a heat of 212° Fah., and yields from thirty-five to forty per cent of a brittle coke resembling charcoal.

The second variety, or bituminous wood, although it still presents, to a certain degree, its woody texture, is generally of a very dark brown or black color, and more closely resembles in its nature some varieties of mineral pitch than the wood from which it was originally formed.

At Meiszner, in Germany, a deposit of bituminous wood is covered by a stratum of basalt more than three hundred feet in thickness, and occurs in flattened fragments which still retain the laminated structure of wood. Its transverse fracture is conchoidal and glossy, its specific gravity 1·32, and the usual color of the substance either dark brown or black. When burnt, it decrepitates on the fire, giving off a very disagreeable odor, and leaves about fourteen per cent of ash.

Common lignite very much resembles in its appearance coals from the secondary formations. Its usual color is black or brown, with a compact structure and irregular fracture. Sometimes the fracture is conchoidal and brilliant, and in this case the substance is often called *jet*, although the true jet from which ornaments are manufactured is not a variety of lignite. This substance contains a less proportion of water than the variety known by the name of fossil wood, and has an average specific gravity of 1·20. When heated, it gives off inflammable gases, together with acid and tarry matters; but the resulting coke in most instances retains the form of the fragment from which it was produced. Less frequently the lignites may be so far softened by heat as to run together and cake on the fire, or even to assume a tarry consistence; but these specimens are only to be obtained from deposits occurring in the fresh water limestone formations.

The earthy lignites, as their name implies, contain a large proportion of incombustible foreign matter. They have a dark brown color and hackly fracture, and, from the quantities of iron pyrites and clay which they contain, are sometimes burnt, for the purpose of manufacturing alum and copperas from the ashes they thus afford.

Crystallization.

All the metals are capable of assuming, under favorable circumstances, the crystalline form. Many of them—particularly gold, silver, copper and bismuth—occur crystallized in nature, and are found either as cubes or octahedrons, or in some of the derivative forms; antimony is, however, an exception to this rule, and affords rhomboidal crystals.

In order to crystallize a metal artificially, it is sometimes sufficient to melt a few ounces in a crucible, and, having permitted it to cool on the surface, to pierce the crust formed and allow the interior to flow out. By this means very beautiful crystals of bismuth may be obtained; but in the case of some of the less fusible metals larger masses and slower cooling are necessary to produce this effect, and consequently these are never found in a crystalline state unless considerable weights have been fused, and allowed gradually to cool, as sometimes occurs in the furnaces in which their metallurgic treatment is effected.

It also frequently happens that one metal may be precipitated in a crystalline form by placing a strip of another metal in the solution of its salts. In this way silver is deposited by mercury; and a piece of zinc placed in a solution of acetate of lead precipitated the latter in feathery crystals. Gold is occasionally deposited in this form from its ethereal solutions, and a stick of phosphorus produces the same effect. Nearly all the metals yield crystals when deposited from their solutions by electric currents of feeble intensity, and it is doubtless to this action that we are indebted for the many beautiful specimens of the native metals which enrich the cabinets of mineralogists.

Water and Morals.

A very slight declivity suffices to give the running motive to water. Three inches per mile, in a smooth, straight channel, give a velocity of about three miles per hour. Now, what is true of water is equally true of morals. The best of men only need a slight push from adversity to obtain a downhill momentum. Be careful, therefore, how you lose your equilibrium.

To carry a Collins steamship from New York to Liverpool requires eight hundred tons of coal—enough to last an ordinary family forty years.

The Worthlessness of Gold.

It is stated by many of the survivors of the *Central America's* passengers, that there was seldom so large an amount of money owned by passengers as was in the case of those who came by the *Central America*. Many were persons of large means, and there were very few whose immediate wealth did not amount to hundreds, while numbers reckoned their gold by the thousands of dollars. The greater portion of the passengers were returning miners; some coming hither to invest the capital they had realized in hopes to live a life of greater ease as the result of their industry, and others to get their families and once more go to the land of gold. But as the storm continued to rage, less and less of gold was thought of, and when, on Saturday, it became evident that they were likely at any moment to be buried beneath the waves, the wealthy men divested themselves of their treasure belts and scattered the gold upon the cabin floors, telling those to take who would dare to test its weight—as a few ounces or pounds might carry them to death. Full purses, containing in some instances $2,000, were lying untouched on sofas. Carpet-bags were opened by men, and the shining metal was poured out on the floor with the prodigality of death's despair. One of the passengers, who has fortunately been rescued, opened a bag and dashed about the cabin $20,000 in gold dust, and told him who wanted to gratify his greed for gold to take it. But it was passed by untouched as the veriest dross. A few hours before he would have struck down the man who would have attempted to touch a grain of that which he now spurned from him.

Lavas.

Lavas are the mineral substances rendered liquid by heat which flow from volcanos of the present epoch, and are generally found extended in the form of thin strata, or appear as a coating on the declivities of the mountains from which they have been ejected.

The name of "schist" is applied to minerals possessing the property of being easily separated into thin layers, and which present the foliated appearance observed in common roofing slate. The term "sand" is applied to small disconnected particles of quartz. When these grains are united by a siliceous cement, the resulting rock is "grit," or "sandstone." This is sometimes found of a white color, but is more frequently stained by some metallic oxyds, as in the old red sandstone, which owes its color to the presence of peroxyd of iron.

The Great Eastern.

A Canadian paper says:—"We are authorized to state that this steamship will be launched in the first spring tides of next month (October). The day is not as yet absolutely fixed, but this important event will probably take place on Monday, the 5th of that month. The tides will be highest on that day."

Gas from Peat.

The first experiment on this continent of lighting a city with gas made from peat, was tried in Portland, Me., a short time since. The light was clear and brilliant, and few of the citizens were aware that coal was not used as usual.

A New Hampshire correspondent of the Boston *Traveler* tells a story of the discovery of lead, copper, and silver mines in that State, near the town of Warren. The lead vein is said to be 800 feet long and 7 feet wide. Copper and silver are said to exist in considerable quantities.

Letters from Bagdad announce an extraordinary fall of rain on the 14th of June at that place, which, from its reddish hue, gave the surrounding country the appearance of a battle-field.

We are indebted to Hon. C. B. Hoard, M. C., Watertown, N. Y., for three volumes of the Annual Report of the Commissioner of Patents for 1856.

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[*Reported officially for the Scientific American.*]

APPARATUS FOR GRAIN AND GRASS HARVESTERS—J. W. Baltzly and Wm. Hobson, of Pana, Ill. : We claim the reciprocating teeth, C, constructed as shown at Fig. 3, in combination with the stationary cutting plates, c, in the fingers, B, for the purpose set forth.

[The novelty of this device consists in the peculiar construction of the cutting arrangement, whereby the grass or grain, as the sickle vibrates, is prevented from being thrown outward from the fingers by the action of the cutters.]

GAS BURNERS—Wm. W. Batchelder, of New York City : I claim the improved method of burning gas described, viz., combining two apertures of different areas, so arranged that a flat stratum of gas issuing in the first instance from the lesser aperture shall impinge and press upon the second and larger aperture placed in the same plane with the issuing jet, and in such manner as to pass it without causing any deviation thereof.

MACHINE FOR BINDING GRAIN—Jos. F. Black, of Lancaster, Ill. : I claim the combination of the arms, I I, J J, and hooks or clamps, u v, constructed and arranged to operate conjointly as and for the purpose set forth.

[We have no doubt this will form a useful adjunct to reaping machines, as it sheaves and binds the grain as fast as cut, and requires but one attendant.]

HORSE POWERS—G. E. Burt, Abram Wright and G. F. Wright, of Harvard, Mass. : We claim the method by which we are enabled to unerringly give such a shape to the ends of the tracks of said machine that closely fitted platform chains may be operated upon them without producing any variation of tension or irregularity in the movement of said chains, substantially as set forth.

LIFE BOATS—M. M. Camp, of New Haven, Conn. : I claim, first, Dividing the hold of a life-boat into sections by the bulk head, C, and having an aperture, I, in the bulk head, to be covered and closed by the swing hatch, H, in the manner and for the purpose specified.

Second, Making the section, H, of the hatch to operate as a cover or valve to close the aperture, I, in the bulk head, C, as and for the purposes set forth.

Third, The combination of the movable combings with the hatch, H, and the aperture, I, in the bulk head, C, as described, and for the purposes set forth.

BEARINGS FOR MILL STONE DRIVERS—Edwin Clark, of Lancaster, Pa. : I claim the rocking bearing, consisting of a cylindrical portion, d, inserted within a cavity in the bearing block, b, and a winged portion, E, passing through a slot in said bearing block, in combination with the bearing recess, m, in the driver, as set forth.

METALLIC PACKING RINGS FOR STEAM ENGINES—P. Clark, of Rahway, N. J.: I claim constructing packing rings of a number or series of layers or lamina of sheet metal in the manner described, for the purpose of securing that flexibility necessary to enable me to bend around a rod a metallic ring having a sufficient quantity of material in it to ensure the requisite durability.

BURGLAR'S ALARMS—Simeon Coon, of Ithaca, N. Y. : I claim combining the spring, E, and hammer, E, in one piece, and acting on a stirrup as above described and constructed.

EDGE PLANE FOR TRIMMING BOOT AND SHOE SOLES—I. A. Dunham, of North Bridgewater, Mass. : I claim the new sole or welt trimmer, constructed substantially as described, that is, with a cutting blade and guard, that together forms a circle or very nearly, and with the cutter so arranged as to be set up to its guard, as fast as it becomes worn, by simply turning the said cutter on its center as specified.

REAPING AND MOWING MACHINES—J. G. Dunham, of Raritan, N. J. : I am aware that the use of a sliding arm, or equivalent means, has been employed for changing the elevation of the sickle, and therefore I do not claim generally the application of a slotted frame and sliding arm for such purpose.

But I claim, in combination with the rear part of the rectangular frame, O, the supporting castor wheels, K M, with the inclined sliding frame, and arms, J and I, adjustable brace, N, and inclined bar, L, furnished with a series of sockets, l, l, l, the whole arranged substantially as and for the purposes set forth.

PORTFOLIO OR MUSIC STANDS—Augustus Eliaers, of Boston, Mass. : I claim arranging the braces or sliding frames which are hinged to and support the adjustable leaves of a portfolio stand in such a way that they shall in sliding always keep in nearly a vertical position for the better supporting the leaves and the weight upon them, by having the traversing and bolting rods move in curved grooves directly beneath them in the sides of the stand, instead of having the bolting rods of each brace or frame slide in grooves on the other or opposite side of the center of said stand, in combination with the locking devices above described, for the purpose of rigidly locking and supporting the leaves, and whereby the whole stand can be lifted by the leaves in removing it from place to place.

HARVESTERS—A. B. J. Flowers, of Greenfield, Ind. : I claim guiding the machine by means of the castor wheels, K K, upright shaft, i, and the horizontal shaft, M, in combination with the peculiarly constructed castor plates, L, L', said parts being arranged to operate in relation to each other, in the manner set forth.

[This invention adds an endless apron to an adjustable frame carrying the sickle, and a new discharging device, so that the grain may be cut at varying hights as desired. The grain may be discharged in sheaves or not.]

STEAM HEATING APPARATUS—Edmund Gibbs, of Madison, Wis. : I claim the boiler, E, with its trough, F, operating in combination with the coil of pipe, O, and its prongs, P and Q, or their equivalents, arranged for the purpose specified.

APPARATUS FOR LOADING LOGS ON WAGONS—Philander Gilbert, of Alexandria, O. : I do not claim any of the parts separately considered; but I claim the peculiar construction and arrangement of the portable frame herein described, when combined with a windlass, and its appurtenances capable of being shifted to either side of a wagon, in the manner and for the purpose specified.

LOCKS—J. L. Hall, of Cincinnati, O. : I claim, first, The construction and arrangement of tumblers, B B' B'', &c., in the described connection with the block, L, back plate, M', the whole serving as a screen or curtain between the hole and the more interior parts.

Second, The described construction and arrangement of bit, C, c, lever, D, d d, and tumblers, B B' B'', &c., whereby the bolt is held securely to its locked position, until the withdrawal of the key.

Third, The described arrangement and combination of the bit, C, c, dog, I, and arm, H, h, for the purpose of tightening the springs in the manner set forth.

MAKING WHITE LEAD—Henry Hannen, of Dubuque, Iowa : I claim subjecting the lead and compounds formed therefrom by the agents employed for this purpose to the action of steam and air, vapor of acetic acid, and carbonic acid gas, alternately and successively until the process is complete, in the manner substantially as and for the purposes set forth.

SAFETY CLASP FOR BRACELETS, &C.—Isaac Hermann, of New York City : I claim the application of the two inclined plane surfaces, F and G, Figs. 2 and 3, and the plate, B, attached to the rod, L, for the purpose set forth, to secure more safely clasps on bracelets, and for other purposes.

And I also claim the combination of the steadying plate, B, with the parts above mentioned, which plate prevents the catches, E E, Fig. 1, from turning aside, the whole is in combination—that is, plate B, Fig. 1, inclined planes, F G, on rod L, Figs. 2 and 3, as set forth.

STIRRUPS FOR RIDING SADDLES—James Neil, of Yorkville, N. Y. : I claim the extension piece, or lever, D D F F', arranged and applied to the stirrup so that when the rider falls, his foot (if it remain in the stirrup) shall operate the said extension piece or lever, D F, so as to free one end of the bar, A, and thus release the stirrup from the stirrup strap, substantially in the manner set forth.

SLEEVE FASTENER—David C. Peacock, of Brooklyn, N. Y. : I claim the construction of a sleeve button secured by a bar affixed thereto at one end by a joint or hinge, passing through holes in the sleeve, and being secured or fastened at the end opposite to the affixed end, in the manner set forth and described.

JOURNALS OF AXLES WITH FRICTION ROLLERS—Geo. A. Prentiss, of Cambridge, Mass. : I claim securing journals applied to the solid axle and friction rollers.

HAND STAMP—T. J. W. Robertson, of New York City : I do not claim, broadly, the employment of revolving type wheels for making impressions, for I am aware that such wheels have long been known and used. They are seen, for example, in nearly all bookpaging machines. But to the best of my knowledge and belief, no hand stamp like mine has ever before been known or used.

I claim the construction of hand stamps in the manner described and represented.

[Letter and other stamping is now an important matter, and the invention is a hand stamp for this purpose, being especially applicable where the letters or numbers have to be repeatedly changed.]

FILING AND SETTING SAWS—Ansley C. Smith and Joseph K. Creighton, of East Birmingham, Pa. : We are aware that several saw-filing and setting machines have been devised, and that files have been placed in reciprocating frames. We therefore do not claim, broadly, the employment or use of reciprocating files, irrespective of the arrangement shown.

Neither do we claim the setting device, irrespective of its construction, and also of its arrangement with the filing device.

We claim the combination of the filing, setting, and feeding device, when the whole is arranged to operate conjointly and automatically, as shown, for the purpose set forth.

[This is a general improvement in saw-sharpening and filing. It consists in files set in reciprocating blocks, which are moved by hand or other power; also an arrangement of hammers to give the set to the saw, and a peculiar feeding device.]

CONNECTING AND DISCONNECTING THE BLOCKS OF IRON OR OTHER PAVEMENTS—Barzillai C. Smith, of Burlington, N. J. : I do not claim securing plates together by means of dowels and channels, or strips or bars and grooves to receive them.

But I claim the mode set forth of locking the plates or blocks of iron pavements, the same consisting of the locking bar, c, and grooves, d d, one of which is of sufficient depth to cover the entire width of the bar, c, while the other is of half that depth, and in combination therewith I claim the grooves, s and m, in the manner and for the purposes set forth.

RAILROAD CAR SEATS—J. H. Swan, of New York City : I claim the combination of the reversible back and seat by means of the lever, a'', substantially in the manner and for the purposes set forth.

I also claim the combination of the levers, a'', the arms, b', and segments, a''', with their attachment for reversing the back, as specified.

TRUSSED BRIDGE—Abram S. Swartz, of Buffalo, N. Y.: I claim the arrangement of the parts described, so that the tower, A, the tension bars, B, and the suspension rod, C, when taken together, will present the distinctive feature of a triangle with the foot of the arch, D, resting upon the tower within the triangle, substantially as set forth.

CARRIAGE PROP—Chauncey Thomas, of West Newburg, Mass. : I claim an improved carriage prop, as constructed with a screw shoulder cap, D, combined with a joint bar standard, A, and arranged between the leather, L, and the joint bars, G H, and so as to screw upon the said standard, substantially in manner as described.

ROTARY STEAM ENGINES—D. C. Turner, of Aztalan, Wis. : I do not claim making the engine with two sets of pistons working in separate steam channels.

But I claim the valve, K, in its recessed seat, and the protuberant rim, f f, as arranged with the steam channels, floating abutments, and hinged pistons, as fully specified.

[A principal feature in this engine is the floating abutment, which, although answering all the requirements of a fixed one, will adjust itself to the changes caused by the wearing of the fans, or other parts.]

RAKES FOR HARVESTERS—Isaac Van Doren, of Somerville, N. J. : I claim operating the rake, A, when arranged in relation to the platform as described, by means of the double-geared sector, G, in combination with the rod, D, and rock shaft, E, or their equivalent, the whole arranged and operating substantially in the manner set forth.

CARDING ENGINES—Wm. H. Walton, of Brooklyn, N. Y., and G. H. Phinney, of New York City : We claim the application and use of a rotary brush for stripping the main cylinder in combination with the lever, K, or its equivalent, by which the main cylinder is stripped and cleaned when running at the speed given by shifting the driving belt from the driving pulley to the loose pulley as fully described and shown in the specification for the purposes set forth.

NUT MACHINE—S. H. Whitaker, of Cincinnati, O. : I claim the use of the preparatory punch, b, and die, N, in the described combination with the shearing and finishing die L, punch or mandrel J, and counter die K, whereby a nut of definite thickness is formed by first partially punching the blank while joined to the bar, and confined on every other side, then separating the blank and completing the punching and shaping, the whole being constructed and operating substantially in the manner set forth.

VALVE GEAR FOR OSCILLATING STEAM ENGINES—N. W. Wheeler, of New York City : I am aware that the "eccentric throw" and "piston head," and that "oscillating throw" and "eccentric" or "cam lead" have been used before. These I do not claim.

But I claim actuating the valves of oscillating steam engines, by the combined movements of the cylinder and piston rod, substantially as described.

FLY TRAP—S. R. Wilmot, of Watertown, Conn. : I claim a fly trap constructed substantially as set forth, and consisting of a receptacle which is constructed and operated in such manner that when it is swept over a table or other object, the mouth is open to receive flies, and when the sweeping movement is finished, the mouth is closed to prevent their escape.

DIVING APPARATUS—Geo. Williamson, of Brooklyn, N. Y. : I do not wish to be understood as limiting my claim of invention to the special construction specified, as my invention of improvements may be applied by the substitution of equivalent means.

I claim the employment, in combination with the nautilus, of the channel ways for the escape at the sides of the compressed air from the working chamber, substantially as described, the said channel ways being made in the thickness at the bottom of the nautilus—that is, between the floor of the working chamber, and the outer bottom surface of the nautilus, as set forth and for the purpose specified.

I also claim combining the nautilus with, and susy pending it to, a float or buoy in the manner substantially as described, so that the apparatus for operating the connecting rope or equivalent may be worked from the inside of the nautilus as described, and for the purpos specified.

And I also claim combining a spring balance or scale with the combined nautilus and float, substantially as specified and for the purpose set forth.

FIRE ESCAPE LADDER—Henry Lowenberg, of New York City : I am aware that ladders with long sacks to convey the occupants of a building to the ladder have been long in common use, but the application of baskets or their equivalent, operated as above set forth, and the manner of elevating and packing the ladders I believe to be new and useful.

I do not claim the extension ladders, neither do I claim the use of ropes passing around or over windlasses for the purpose of drawing or extending the ladders after they have been elevated to the desired angle ready for extending.

But I claim the manner of regulating or adjusting the trucks, f, f', Figs. 2 and 3, by means of the hinged guide pole, k, Fig. 2, or guide bars, Fig. 3, arranged and operating in the manner and for the purpose of supporting the ladders when secured by the rope, I I', at any desired angle, substantially as described.

COOLER—W. F. Messenger and Henry Rehahn, of New York City : We claim the refrigerating saddle, A, substantially as set forth.

[These coolers are adapted for casks, and more especially those containing liquids on draught, or those that are drawn through a tap, and are made to fit on the upper half of the cask or barrel.]

MACHINE FOR DISTRIBUTING TYPE—Wm. H. Mitchel, of Brooklyn, N. Y. : I claim, first, The inclined check block, I, in combination with notches in the sides in the types, so placed that notch of the first type comes in contact with the said inclined check block when the type is projected its thickness beyond the end of the slide containing the line of types, so that only one type at a time is separated from the line of types, as specified.

Second, I claim the use of studs or pins uniformly placed to take notches variously placed in the types, thereby sustaining the types in various positions to be dropped or distributed, when said types reach receptacles adapted to the peculiar positions of said types.

Third, I claim the method described of distributing types by the revolving wheel, l, with its grooves and pins X, when combined with the stationary inclines or offsets, substantially as specified.

Fourth, I claim distributing types from uniformly placed and moving pins, or their equivalents, by the use of a second notch in the type, combined with suitable offsets or inclines to disengage the first notch of the type, and then allow the type to be suspended by the second notch for distribution, substantially in the manner specified, thereby providing for distributing greater varieties of types, without requiring extreme accuracy in the position of the notches as specified.

Fifth, I claim the oscillating ring, y, and connecting rods, Z, in combination with the pushers, 32, for the purpose and as specified.

PENCIL SHARPENERS—J. W. Strange and Samuel Darling, of Bangor, Me. : We do not claim the mere multiplication of cutters of various sizes in the same stock or holder, but the combination of two cutters, constructed and arranged to reduce the wood and the lead separately, substantially as set forth.

WRENCH—H. D. Blake, of New Hartford, Conn., assignor to W. H. Warner, of New Britain, Conn. : I claim the combination with a vibrating stock or handle, arranged for action, substantially in the manner described of the two or inner and outer sliding jaws of the wrench, jointed on opposite sides to said stock or handle, and both jaws operated or expanded and contracted in reverse directions, to effect and release gripe by the lateral throw or motion proper of said handle, in both directions of its swing essentially as set forth.

Also, while not claiming a projecting thumb-piece to a single sliding jaw to lock or release the gripe of the same by means of a cam or its equivalent connected therewith, I do claim providing the one with a projecting thumb piece, f, arranged to overlap the jointed attachment of said jaw to the stock and forming a rigid extension as it were of said jaw to facilitate the action or movement of both jaws, substantially as shown.

HARVESTERS—Samuel Pennock, (assignor to himself and Morton Pennock,) of Kennett's Square, Pa.: I claim adjusting and regulating the position of the crank shaft, E, by means of mechanism constructed, arranged and operating in the manner set forth.

[This invention consists in placing the crank shaft within a frame, which is pivoted to the main frame, and operated by an eccentric, so that the shaft guiding the frame may be easily thrown in and out of gear.]

LATHE FOR THE MANUFACTURE OF CLOTHES PINS, &C.—John Humphrey, of Keene, N. H., (assignor to himself and Amos E. Perry, of Harrisville, N. H.) : I claim the method of feeding the pieces to be turned to the spindles, when their relative positions are changed as shown, and in combination with the above, removing the finished pieces from the spindles, the whole being arranged and operated in the manner and for the purposes set forth.

RE-ISSUES.

CAST IRON CAR WHEELS—Abson Atwood, of Troy N. Y. Patented May 15, 1847. I claim connecting the rim of a wheel cast in one piece with a solid hub, by means of a single waved plate, in combination with the dished flange or flanges of the hub, forming a ring concentric with the rim of the wheel, substantially as described, whereby the several parts can yield to the unequal contraction in all directions without serious strain of the metal.

CAST IRON CAR WHEELS—A. Atwood, of Troy, N. Y. Patented May 15, 1847 : I claim a cast iron disk, corrugated in the manner substantially as and for the purpose described, when used in connection with the chilled rim of a cast iron wheel.

SEED PLANTERS—Solomon T. Holly, of Rockford, Ill. Patented June 16, 1857 : I claim first, In combination with a machine that drops its seed automatically, a hand lever and clutching apparatus, that enables the operator to quicken or retard dropping, so as to bring it to the exact spot, substantially as described, and without disarranging or injuriously affecting the automatic movement.

I also claim, in combination with the wheel, s, having its center of motion at e, and furnished with openings, i, the lever, m, with its plate, p, and hung or pivoted at a point eccentric to the point, e, so that the plate, p, can cover or be drawn within the range of the openings, q, at stated intervals, substantially as set forth.

I also claim the employment or use of the indicator, b', connected with the valve U, and arranged and operated as shown, and for the purpose set forth.

REMOVING PHOTOGRAPHS FROM GLASS TO PAPER—Edward Howell, of Ashtabula, Ohio. Patented May 19, 1857 : I claim the described use of beeswax, or its equivalent, laid upon the surface of the glass plate previous to applying the collodion film, chemicals, and colors, as described, for the purpose of facilitating the removal of the picture, together with the manner of causing the backing paper to adhere to the finished picture, thus giving it strength to overcome the adhesion of the wax, or its equivalent, to the plate of glass, in the manner specified.

DESIGN.

GAS BURNER SHADES—George B. Foster, of Boston Mass.

Activity at the Patent Office.

Within two weeks past, the Examiners at the Patent Office, under the supervision of the new Commissioner, have evinced a marked degree of alacrity; and at the rate they are now progressing, the back work of the Office will soon be brought up. The Chief Examiner of the Agricultural Class has recovered from his illness, and is back at his post again; and we are assured that those who have had cases long pending in this department will speedily obtain decisions.

There is not the usual number of applications made, at present, owing, probably, to the closeness of the money market; but we can assure inventors that there never was a better time to apply for patents, and to get justice done in the examination at the Patent Office, than the present.

Advice concerning the patentability of inventions is freely given, without charge, at this office. Specifications, drawings, &c., are also prepared on the most reasonable terms, at the Scientific American Patent Agency, No. 128 Fulton street, New York, or at our branch establishment, opposite the Patent Office, Washington.

All communications should be addressed to "Munn & Co., New York." See advertisement on another page.

Crystal Palace Visitors.

We are pleased to be able to state that a greater number of visitors than at any previous fair have entered the building this season. Every evening the whole of that vast space is thronged; and we have it from good authority that on Friday the 25th ult., no less than $1000 was received at the doors, and allowing about 1000 free admissions for exhibitors, etc., there would be an attendance of 5000 persons. This is a good beginning; we hope it may be kept up throughout the season.

The Cotton Crop.

The cotton crop of the United States for the present year, is estimated at 3,000,000 bales. Allowing 600,000 bales for domestic consumption, and there will remain 2,400,000 bales for export. The present prices warrant an average of sixty dollars per bale, which would give an aggregate value of exports, from this source alone, of nearly one hundred and fifty millions of dollars.

Frederick Sauvage.

Frederick Sauvage, whom the French claim as the first person to conceive the idea of applying the screw as an auxiliary of steam, died a few weeks ago in Havre, France. His fortune and health had been ruined by his labors in scientific discoveries, and his reason had left him in consequence of his chagrin of different kinds.

On the 11th of September last, the first locomotive ever run in the State of Arkansas traveled over the track of the Memphis and Little Rock Railroad, for a distance of three miles—as far as the road is completed from Memphis.

A good antidote for poisons, and one which it is useful to know, is, when poison has been swallowed accidentally, take two teaspoonfuls of ground mustard mixed in warm water. It will operate as an instantaneous emetic.

The ant is said by naturalists to produce 86,400 eggs each day, which continuing for a lunar month, gives the astonishing sum of 2,419,200. This being about one egg in two seconds, very little time is consumed in cackling.

The use of steel axles and tires is common on the German railroads. We understand that they are also being introduced into this country, in a limited measure.

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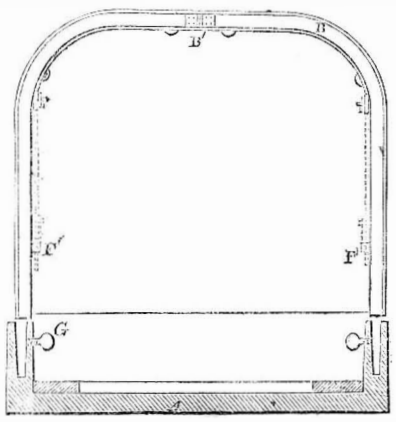
New Inventions.

Jennings' Improved Carriage Tops.

The inconvenience of having a top or cover rigidly fixed to a vehicle is often felt, and a top which will take off and put on is so cumbersome and unseemly that they are seldom adopted. Mr. Jennings has endeavored, in the invention here illustrated, to render a top light, portable, and easily adjustable, and its construction will be seen by reference to the following engravings.

Fig. 1 is a front view of the whole, Fig. 2 a transverse section, and Fig. 3 a plan of the

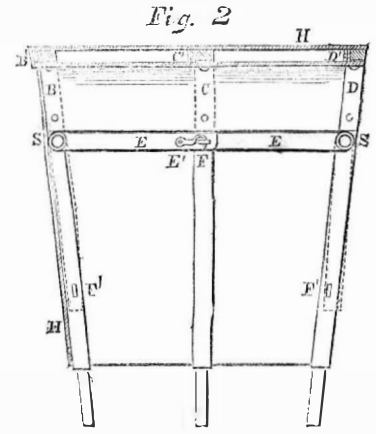
Fig. 1



arrangement. The same letters refer to similar parts in each.

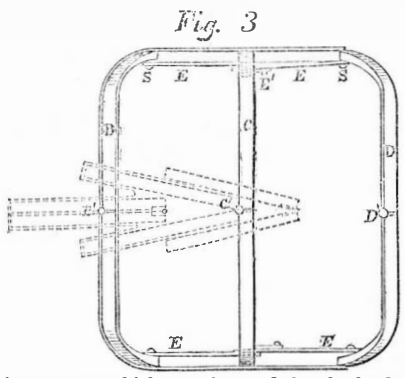
A is the seat or body of the vehicle, having a slot at each side, in which the bows of the cover fit, and G are screws, which hold them

Fig. 2



just when fixed. B C D are the frames or bows, which are made of the usual material and shape; they are, however, divided in the center, and are capable of being folded by means of the hinges, B′ C′ D′. The bows are connected together and held apart by the

Fig. 3



pieces, E E, which are fastened by the hook, E′, passed through the staple, F. F′ F′ are other staples, to which E E are fastened when the whole is folded. S S are the hinges for E E, and H is the cover cloth.

The folding operation is very simple. The cover cloth is loosened, and the catch or hook taken out of the staple, and the whole then doubled up by means of the hinges in the bows. It is an inexpensive and useful invention, and was patented March 31, 1857.

For further particulars and information apply to R. S. Jennings, Waterbury, Conn.

Improved Grain Cleaner.

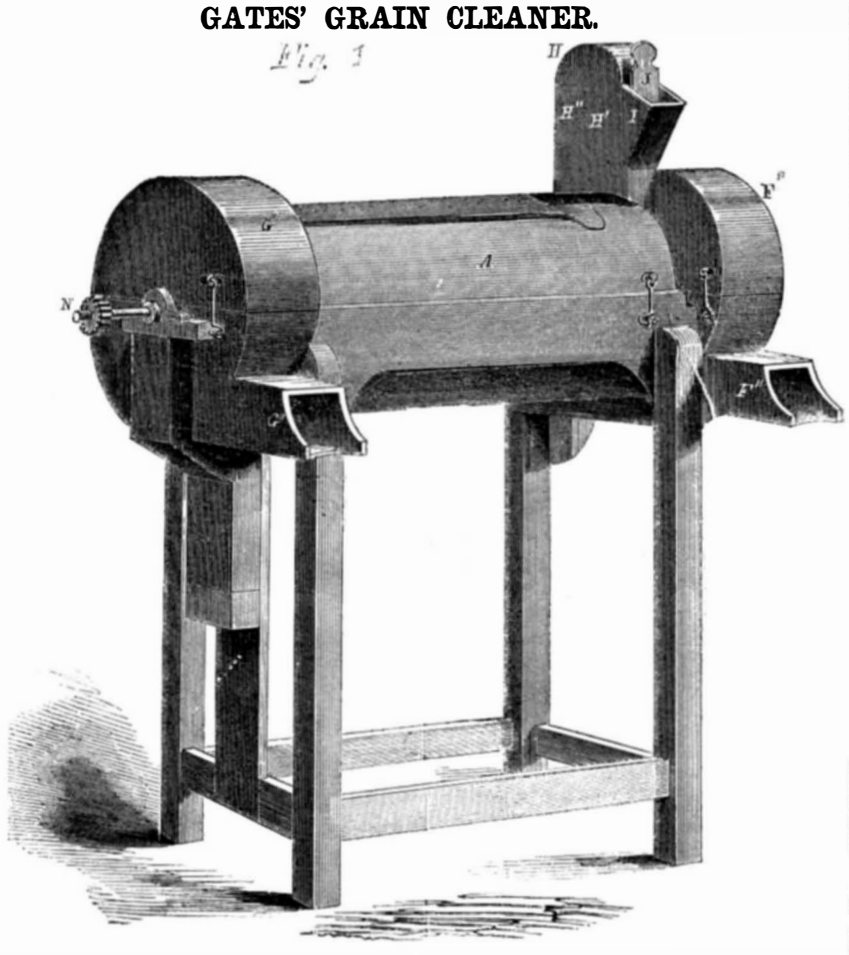
J. R. Gates, of Eckmansville, Ohio, is the inventor and patentee of the machine here represented for cleaning grain. It was patented on the 19th of May last, and is already, to some extent, in use. The grain is beaten by alternate contact with beaters, on a rapidly revolving horizontal shaft, and a lining of burr stone within the lower half of the inclosing case. A powerful blast of air is drawn through, to remove the dust and smut, by the aid of a fan at one extremity of the case, and a circulation of air passing through the feed box is introduced by an additional fan at the other extremity; and by the aid of the latter the coarse dirt, and all the false grains, cheat, etc., are moved.

Fig. 1 is a perspective view, Fig. 2 a longitudinal section, and Fig. 3 a transverse section.

A represents the exterior of the cylindrical case which forms the cleaning device, B is a horizontal shaft, and C represent beaters dis-

GATES' GRAIN CLEANER.

Fig. 1



posed thereon, and extending radially to the surfaces of the burr-stones, D, which line the lower portion. E represents an inside case, only employed on the upper half, and which is perforated, to allow a draft of air to rise upwards among the agitated grain. F represents a fan fixed in a suitable box, F′, at one extremity of the cleaner, and G a similar fan in a similar case, G′, at the other extremity. Both fans are fixed on the shaft, B, of the mill, and both discharge a powerful blast of air through their respective apertures, F″ and G″. H is a box intervening between the fan, F, and the body of the mill, and which is, by a suitable partition, divided vertically nearly to the top, thus connecting two vertical passages, H′ and H″, connected at the top. I is a hopper, into which the grain is fed, and J a slide, by which the rate of feed may be controlled.

Fig. 2

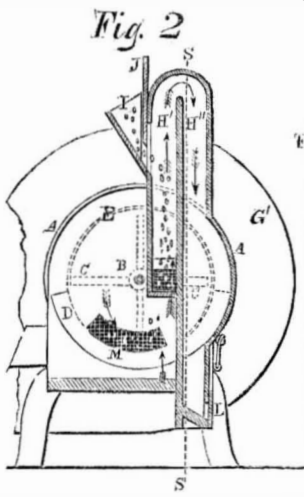
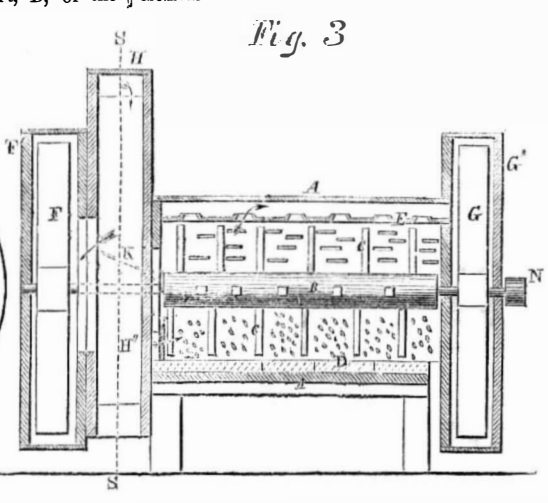


Fig. 3



K is an inclined screen of wire, which extends across the passage, H′. This is the passage into which the grain is fed from the hopper, and the screen, K, receives the falling grain, inclines them inward, and throws them through a suitable aperture into the cleaning device, A B C. The fan, F, draws a strong current of air upwards through the screen, K, which carries all the loose dirt and light grains up the portion H′, over the upper edge of the separating partition, and down the portion H″. About the middle of H″, the air turns sidewise, and enters the fan box, F′, while the heavier cheat descends by its momentum, and lodges in the lower portion of H″, from whence it may be removed at intervals by opening the door, L, which is held by a spring. M represents a netted opening in the lower portion of the case, A, at one end, through which a liberal supply of air rushes, to cleanse the grains, and which finally rises, as indicated by the arrows, carrying the dust removed by the agitation through the openings in E, into the fan, G, and is discharged through G″. S S (Figs. 2 and 3,) represents the lines of section on which Fig. 2 is taken.

For further information Mr. Gates may be addressed as above. See advertisement on another page.

Good News for Inventors.

The various employés of the Patent Office are now at their posts, after their summer vacation, and the Department hums with industry. We are assured that all patent cases will now receive prompt attention. This is good news for inventors. Send on your models, all ye who want patents!

Inventors, to the Rescue!

The late terrible disaster to the steamer *Central America* should be regarded by inventors as a special call upon them by suffering humanity. Five hundred strong men, with death staring in the face, were unable to construct anything that was capable of properly floating them; and at the end of two days they were miserably launched into eternity.

The steamer had five life boats of the best known construction—four were of wood, and one of metal. The latter, in the effort at lowering, was thrown by a sea against the vessel's side, and stove. It sank, a useless shell. One of the wooden boats was also stove and sunk.

It would seem that the *Central America* had plenty of pumps, but they became choked up, or, in some unaccountable manner, were broken. The cylinder or barrel of one of them is reported to have bursted.

The life-preservers were of tin, and it is said that the least dent rendered them entirely useless.

We appeal to American inventors, and ask them forthwith to apply their minds to the invention of new devices for the saving of life when endangered by such catastrophes as that which had just engulfed the *Central America*. Cannot pumps be invented that will never choke? Cannot life-boats be made that will not sink? Cannot life-preservers be produced that will be available in case of necessity? Can no new article be invented, compact when not in use, but strong, efficient, and ready when disaster comes? Can every other conceivable thing be done by inventors *except* flotation upon the water's surface?

Contemplated Introduction of Seed from Northern China.

Mr. Robert Fortune, who has been employed for several years by the East India Company and the London Horticultural Society, to collect seeds and plants in various parts of China, has offered his services to the Patent Office, to visit the northern provinces of that country, to procure the seeds of the best varieties of the tea-plant, as well as others, with a view of cultivating them in the United States. The Commissioner of Patents has responded, inquiring the amount of compensation he may ask, and solicits a paper on the subject from him for the next Agricultural Report.—*Exchange*,

[We hope that this is true, and that Mr. Fortune's services will be accepted, as he is a gentleman of high botanical acquirements, and will do honor to any nation who employs him. He is well acquainted with China, and has written several descriptions of his adventures and travels in that country.

Fifteen Hundred Dollars in Cash Prizes.

The proprietors of the Scientific American, desirous of increasing their circulation, and doing away with the system of employing traveling agents to solicit subscriptions, offer the following splendid prizes for fifteen of the largest lists of mail subscribers received at this office before the 1st of January, 1858:—

For the largest List	$300
For the 2d largest List	250
For the 3d largest List	200
For the 4th largest List	150
For the 5th largest List	100
For the 6th largest List	90
For the 7th largest List	80
For the 8th largest List	70
For the 9th largest List	60
For the 10th largest List	50
For the 11th largest List	40
For the 12th largest List	35
For the 13th largest List	30
For the 14th largest List	25
For the 15th largest List	20

Names of subscribers can be sent in at different times and from different Post Offices. The cash will be paid to the orders of the successful competitors immediately after the 1st of Jauuary, 1858. Circulars giving further particulars may be had gratis by sending to the publication office, 128 Fulton street.

We hope our friends throughout the country will avail themselves of the above liberal offer, and while they oblige us, they will be benefited to a far greater extent themselves.

☞ See Prospectus on the last page.

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Scientific American.

NEW YORK, OCTOBER 3, 1857.

Failure of the Atlantic Telegraph.—Its Cause and Prospects.

This, the greatest enterprise of the age, has for the present been baffled, if "not defeated," and it becomes us to inquire critically into the causes which led to such an unfortunate result. No other public event within our recollection excited more general attention; the people of two continents were personally and nationally interested in the issue; and with the most extensive measures there were combined the most ample means to insure success. The Atlantic Telegraph Company entertained the lofty design of enabling the Old and New Worlds to hold converse together through the waters of the ocean, and the hearts of the people responded to their call for aid to carry out this grand idea. Wealth poured into their coffers in a stream, and they were enabled to call to their assistance the highest scientific and mechanical skill to complete the undertaking. And not only was the sympathy, but also the power, of the two greatest maritime nations on this globe enlisted in their service, and the noblest ships of those nations' navies were placed at their disposal. It was reported, through the agents of the Company, that the most minute and perfect preparations had been made to secure success, and that experiments made under their direction put doubt almost out of the question.

The fleet which was to lay the submarine telegraph cable left Ireland on its grand mission amid prayers and cheers for its safety and success; but alas! for the miserable arrangements of those who had charge of the undertaking, the ships had only sailed about four miles when the cable became entangled with the machinery, and was cut in twain. Luckily, however, the depth of water was but moderate; the broken cable was fished up and mended, and away the expedition again steamed, at the rate of five miles per hour, for three days. Here, when about three hundred miles out, and in very deep water, the Chief Engineer, Mr. Bright, cast his eye, like a philosopher of old Gotham, along the cable, and fancying that it was running out much faster than the vessel was "going a-head," he ordered the mechanic in charge of the brake to apply one hundred pounds extra pressure, and check the cables' speed. This, it is said, was done under a remonstrance, but nevertheless it *was* done; the ship gave a lurch, the cable parted like a pack thread behind the frigate, and in one minute, by this simple action, the objects of this magnificent enterprize were frustrated. We can imagine the deep mortification which every one on board the combined fleet must have felt, when the fact of the disaster became known, and that the broken cable was lying two miles deep on the bottom of the ocean, without the possibility of being rescued.

When we take into consideration the vast resources brought into requisition, and the gigantic efforts made to conduct the undertaking, and how all these were rendered abortive by the addition of only one hundred pounds extra pressure to that of three thousand pounds already on the paying-out machinery of the cable; it is enough to throw ridicule on the whole affair. That extra hundred pounds pressure was the straw placed on the overloaded camel which broke its back—the mouse-bite which put the lion *hors de combat*. Instead of complete provision having been made to meet every real or supposed contingency, efficient means were not provided for the very first and most essential arrangements to insure success, namely, positive mechanism to prevent undue strain upon the cable under all *known* conditions. Without such provision, it is palpable that the laying of the cable by this expedition more resembled a lottery than an important scientific, engineering, and nautical operation.

Several contingencies in the laying of the cable might have arisen to defeat the enterprize, but could have been provided for. One was the paying-out of the cable at a less speed than that of the vessel, whereby it would become too *taut*, and be broken by the propelling power of the steamer; a second was too great restraining pressure applied to the paying-out machinery, when the cable was descending at a high velocity into very deep water; a third was, the running out of the cable at a greater speed than that of the vessel, whereby it would all be run out before land was reached. It was left to the skill of those intrusted with the undertaking to meet these exigencies, should they arise; and one of them having arisen, according to a *dark* conjecture of Mr. Bright, he provided for it in such an effectual manner as to cause the union fleet of America and England—after all the feastings, ceremonies, and speeches made before setting out—to return to Old England after running off only 300 miles of cable, with their colors drooping from every mast.

It would have removed the sting of blame from those who had charge of the undertaking, if they had candidly confessed to gross mismanagement or defective arrangements; but the first reports which they circulated were calculated to smooth over the *great failure*, and to hide their faults. It was stated that the laying of the cable was not defeated, but simply delayed: and that it was perfectly demonstrated (against the opinion of those who doubted) that messages could be transmitted through the entire length of the cable, when laid, because communication had been kept up between the vessel and the shore until the cable was broken. But nothing was added to our store of knowledge on submarine telegraphing by the messages sent three hundred miles through the broken conductor, as the one laid in the Black Sea during the Crimean war was nearly as long. Experiments, it was stated, had also previously been made with a section of the cable, by which it had been discovered that it was to be converted into an elongated "Leyden jar," the power of which was proportioned to its length, and that its mechanical powers to record messages, increased with its length. The letter of Professor Morse, quoted by us two weeks ago, lets us into a secret on this point, which is worthy of much reflection. He stated that, instead of the current becoming more powerful, and the action slower, as would be the case were the cable to be converted into a "Leyden jar," the current became feebler and feebler as the cable was being paid out; but he added, "he did not consider this a serious difficulty." We, however, cannot look upon it in any other light than a very serious difficulty to telegraphing through the ocean, even if the cable were laid. Could the conductor wires of the cable be as well insulated as land lines in dry weather, we have not the least doubt (leaving the "Leyden jar" theory entirely out of the question) that telegraphing could be performed through the entire ocean. It is in this feature of ocean telegraphing that great difficulty is to be apprehended, especially as the pressure of the water on the submerged cable at two miles depth (where it was broken) amounts to 4,563 pounds on each square inch. The pressure of the ocean at great depths has forced salt water through the pores of sealing-wax into a bottle containing fresh water; and if it does so with the gutta percha coating of the cable, the subtle electric wave never can be transmitted from Ireland to Newfoundland. It has been stated that a section of the cable was submitted to the hydraulic pressure of four tuns in a box, and that it withstood this test perfectly. But a small leak in a short section would be of very little consequence; it is a very different thing, however, when perhaps a thousand small leaks occur in several hundred miles of cable. In the former the loss would scarcely be noticed; in the latter, the entire current would be dissipated.

We have pointed out, as we view it, the real cause of the catastrophe to the telegraph cable. It was not exactly owing to an indiscreet order of Mr. Bright, (though that immediately brought on the fatal result,) but the want of certain means and efficient mechanism to provide for every contingency of strain upon the cable, and without which it never can be laid. Such mechanism can surely be constructed, and the pressure or strain upon the cable regulated by graduated springs to an hair's breadth.

By the latest accounts from England, it is reported that the Directors of the Company have come to the conclusion to delay the attempt to relay the cable until next summer. This decision, in our opinion, amounts to a confession that the failure of the undertaking was more complete than has been reported, and that there is some disagreeable fact connected with it, not yet given to the public; it has also the appearance of an attempt to delay the enterprize indefinitely. We insist, however, that they are bound, in honor, by the means placed at their service, by what has been done, and by what has failed to be done, to lay that submarine cable safely through the Atlantic, whether or not a single message should ever pass from shore to shore through it.

Electricity.

How often does each one of us make use, in some way or other, of this mighty force, which we have, as it were, chained down and trained to our will! And yet how few of us ever turn aside from our daily avocations to inquire what this electricity is, from whence it comes, and whither it goes! We acknowledge its existence and make a most material use of its powers, and then we stop, just when we might commence an investigation full of interest and instruction. Let us take the initiative, and give a brief exposition of the results of the latest experiments into the nature of this science, chiefly taken from the works of M. A. De la Rive and Professor Faraday, of Europe, and many experimenters in this country; and here we may remark that it is always the aim of the SCIENTIFIC AMERICAN to give the names of the great men of science to whom we are indebted for information, not so much to vouch for its authenticity as to carry out the principle of "Honor to whom honor is due." All material substances (solids, fluids, and gases,) are capable of being resolved into a certain number of so-called elements, or substances which have resisted all attempts to be split up into any other substances, and it is to be proved that all these elements are composed of infinite molecules or atoms, which are supposed to be indivisible. These are so minute that the most powerful microscope has not detected them; but science has demanded that there must be some ultimate form of matter acknowledged which shall be a starting point from whence to explain all the various phenomena that comes within our view, and as this atomic form is the only one that will do this, it is received throughout the world as the correct idea. Moreover, each of these atoms has a definite weight, or rather relative weight, compared with the atoms of another substance, and they will combine with other substances in the proportion of those combining matters—equivalents or weights. This theory was first introduced by John Dalton, of Manchester, Eng., at the commencement of this century, and is the "atomic theory of matter" to which every man of science must subscribe, or he cannot explain the phenomena of nature. What, then, is electricity? It is a change in the arrangement of these particles—a moving of them among themselves—and as there is no rest in nature, electricity is always being developed. Some assert that these particles are always revolving, even in the most quiet state of the body which they compose; others again tell us that they never move of themselves, but require to be excited into motion; and that then the motion is carried on in a wave-like progression continuously. Whichever way this may be, it is certain that a change in the arrangement of the molecules of matter must take place before electricity can be developed, and that it is never developed without such a change. For instance, the ordinary telegraph arrangement: the source of their electrical force is a voltaic battery, which consists of two dissimilar metals and a dilute acid. The acid, by chemical action, produces motion in the atoms composing the metals; these, by induction or sympathy, do the same with the wires, and so the motion which developes electrical force is transmitted any distance; and by stopping the current momentarily, and again continuing it, you are able to make the required signals. This is the true philosophy of telegraphy, and from this instance we adduce the fact that electricity is the result of motion. We can, however, give many others, as, for example, when ductile metals are heated, no electrization takes place, but when crystals are heated, a change takes place in the arrangement of their particles, and electricity is manifested.

Again, chemical force, heat and electricity, are so nearly related that one may be made the measure of the other two, and the amount of water decomposed into its constituent gases will tell the amount of electricity consumed to do it; or the amount of chemical force required to unite them, will give us the quantity of electricity developed in the change of atomic arrangement.

We have spoken of the wave-like motion of electricity along conductors by induction, as in the case of telegraph wires; but in the case of wires covered with a non-conductor, like the Atlantic cable, and surrounded by another good conductor, as the surrounding iron wire and water, it is not conducted in this way, for then the conductor is in exactly the same relations as a "Leyden jar"—which is an instrument for (so to speak) storing this force, and must be considered in a different way to an ordinary wire suspended in the air. From this point we may regard the phenomena described by Professor Morse, that the current grew feebler and feebler as they payed out a greater length of cable.

The Twenty-ninth Annual Fair of the American Institute.

SECOND WEEK.

The ground floor and galleries of the Crystal Palace are not filling up as fast as we would like to see them, and, as yet, the Fair seems scarcely to be really (although officially) opened. But the number of visiters is daily on the increase, and all seem to be satisfied and edified by the collection of industrial trophies exposed to their view. We shall now proceed to notice a few of the most important novelties that have arrested our attention during our strolls through the building, and also say a few new words about old friends.

One of the first things that strike us, on walking up towards the east transept, is a small crowd gathered on our right hand, and, of course, we step aside to see the object of their admiration. Within a railing is a person moving a handle to and fro, and then taking up an inking roller, he passes it behind a sheet of parchment, and bringing it back, moves the handle to and fro again. We at last get nearer, and are then enabled to discover that this is "Lowe's Patent Printing Press;" but it is so unlike the ordinary cumbersome arrangement, that its purpose did not at first strike us. The bed on which the type rests and the tympan are of the ordinary construction, with the improvement that the lowering and raising of the tympan is automatic. The press consists in a conical-shaped wooden or steel roller, which performs half a circle over the tympan, thus perfectly and equally pressing all the type, and giving a good, clear, and perfect impression. We saw specimens of common type, bronze color and wood-cut printing, also engravings printed from steel and copper plates, and some beautiful samples of embossed or die work, both plain and in colors; and, moreover, the machine will copy letters with facility. These

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presses are made from a size that will print a sheet of paper measuring five inches by six, up to any larger size required, by the Lowe Press Company, Boston. They are cheap, portable and complete, and are well adapted for small job work or card printing.

"Empire Looms," made by Benjamin & Reynolds, Stockport, N.Y.: six of these are in the same transept, just across from the above-mentioned printing-press, and attract a great deal of attention by the noise they make in the rapidity of their motions. The history of the weaving and manufacture of textile fabrics may be truly said to be a good history of civilization. First, the platted garments of the early Eastern nations; then the hand-looms, which were first rude and rough, but still capable of turning out the linens and muslins of India and the silks of China; these were improved each step they marched Westward, until at last they attained the hight of perfection. They were suddenly abandoned as too slow and plodding for the rattling nineteenth century, go-a-head power looms, of which class the "Empire Looms" are among the best we have ever seen, and for the following reasons:—they are compact and work with a steady motion, no shake or jar, as the beam strikes the weft; they are provided with a friction instead of a fast and loose pulley to receive the power, and throw the picker with a rocking bar which is sure and true. They will turn out from 40 to 46 yards a day of common printing calico, with 64 picks to the inch. On the whole they appear good and substantial machines.

F. M. Ray's (of New York) "Volute Car Spring" is worthy of mention, as also the method adopted to prove its elastic powers, which consists in a lever of the second order, the spring being placed close to the fulcrum, and between it and the weight, which is one of about 70 pounds at the end of a very long lever, and the pressure on the spring must be very great; still it is perfectly elastic, and will keep the weight in motion some time when it is pressed down and freed.

Geo. W. Bishop, of Brooklyn, has a machine for taking up stones from fields or other places. The inventor calls it a "Stone Picker." It consists in a low platform, (not unlike that of a reaping machine,) across which, a piece of wood, shod with iron works up and down, being lifted off in its descent, and let on the ground a few inches in advance, when it is dragged up the platform, and brings with it any stones and rubbish that are in its way, and deposited them in a receptacle at the back of the machine. This is effected by cranks and connecting rods on the wheels, and suitable guides on each side of the platform. The inventor states that he has collected ten tons of stones in two hours by this machine.

The "Union Roller Cotton Gin" is a new invention, which aims at producing a uniform appearance and condition in the cotton throughout the season, and is engraved and described in No. 43, Vol. XII., Scientific American. The company's address is No. 6 Liberty street, New York.

Roys, Wilcox & Co., of East Berlin, Conn., have a beautiful show of tools employed by tinners and metal plate workers generally, among which we would especially notice the machine for doubling and making joints, and a new metal plate cutter. The great difficulty with these implements usually is, that when you move the machine, you change the relative position of the two cutters; but here they are both mounted on the same frame, and are moved backward and forward without changing their relative position, so that they do not require to be re-set with each piece of plate cut.

John Stephenson, of New York, exhibits a new street railroad car (one of the Fourth avenue line). It is painted a light color outside, and is an elegant and commodious vehicle; when you seat yourself inside, you are not disappointed, for the seats are delightfully comfortable. As far as we could judge, ventilation seems to have been attended to. The internal decoration is complete; the panels being painted with comic pieces, tolerably well done.

E. V. Haughwout & Co., of New York, have a magnificent stand, on which they display china ware of all shapes and patterns, and fit for nearly every use, beautifully decorated with mild and harmonious colors. Glass-ware of many kinds and qualities, and silver and plated ware of the finest quality and design. They also exhibit a great variety of cutlery, which, if its quality is only equal to its polish, is first-rate. But that which struck us most is the frame of chandeliers or gasoliers, (the latter is, we believe, the proper word,) which is over their stand, and forms part of their show. These gasoliers are some of the most chaste, elegant and best adapted that we have ever examined; some of them are gems of artistic design, yet their useful application is kept in sight, as there is no attempt to hide their ulility by ornament; but their necessary parts are made the foundation for much artistic effect and material beauty.

Bartlett & Lesley, of New York, exhibit one of their hot air furnaces for warming and ventilating public and private dwellings. The aim of this furnace is to enable a current of cold air to pass over an unusually large portion of heating surface, and be sent out warm enough to render the dwelling comfortable in the cold of winter. This furnace has an advantage over many, namely, it is very compact and easily kept clean, and is not liable to get out of order in any way.

The "Kerosene Oil," distilled from cannel coal, gives a most brilliant, clear, and white light; it is non-explosive, and has double the illuminating power of coal gas, and is the cheapest light that can be obtained; it is also valuable as a lubricator, and will not gum—so, at any rate, say its vendors, and from what we have seen of it, it does not belie their statements. Of its comparative cost, we can say nothing, but of its illuminating power, we can say that it is a good light, if not a better than we have ever beheld. It has, however, one drawback, viz., that it must be burnt in a peculiar lamp; the worst of all these new supplies are that they want new apparatus to render them perfectly practicable, and we think that on this account King Burning Fluid's crown is quite safe for some time to come. We are, at all events, glad to see the Kerosene Oil, as it demonstrates the fact that we are utilitizing our coal in more ways than one. It is exhibited by the agent of the company, Austens, of Beaver street, New York.

"Ford's Patent American Window" is a useful device for comfort and convenience in the arrangement of windows. They are so constructed that they will slide freely up and down in the sash, and will also open from the center as a verandah shutter; they have no rattle or shake, and are thoroughly air and water tight. We saw one which has been exposed to the weather for the past year, and, with the exception of the paint being soiled, it is as good as new.

"St. John & Brown's Patent Reciprocating Street Sweeping Machine" seems to be an invention of some value, and sweeps the dirt into heaps on either side of it, so that by passing up and down a street as many times as the width renders necessary, the whole of the refuse would be thoroughly swept to the side gutters, when the rain would wash it, or it could be conveyed away in carts. The office is No. 3 Water street, New York. An engraving of this invention appeared in No. 29, Vol. XI., Scientific American.

"Bunker's Life-Preserving and Bathing Shirts" are found swimming about in a tank of water, and are what may be called a philanthropic and humane invention. When not inflated they may be worn without inconvenience on the person, and they are easily inflated so as to buoy up the body for an indefinite length of time. They consist of a double water and air proof bag, which fits close to the person; and when in the sea, they can be filled with air by a few breathings through a pipe. They are light, comfortable, and highly useful. Had each passenger of the unfortunate *Central America* been furnished with one of these, or another life-preserver of similar kind, all the lost might have been saved. But it is useless to mourn over the past; let us learn for the future.

The pictures, this year, are not very good, in truth some of the oil paintings are mere daubs; but the photographs are excellent. Those by Gurney, Fredericks, Meade Bros., and other artists of New York, are excellent specimens; while Holmes' "Beauties of America" are truly beautiful and cheap pictures of many places of historic and local interest on our continent.

We hope next week to report the Fair complete in all its departments, and that the machinery will be in perfect running order.

An English Opinion of the United States Patent Office Management.

The London *Engineer*, in copying an article from the Scientific American, in reference to the question of priority of invention between Kelly and Bessemer, for improvements in the manufacture of iron, (which question, as many of our readers will remember, was decided against Bessemer,) indulges in the following comments:—

"We trust our readers will not for one moment conceive that our admiration of the Patent Office of the Americans extends to their mode of granting patents either to their own countrymen or to foreigners; or that it will be thought that we look upon their mode of charging English inventors about six times as much as native ones with any other feeling than that of disgust, considering it most unjust, and especially so as we make no difference with regard to American inventors and those of our own country. Neither have we failed to notice the late proceedings of the American Patent Office in relation to Mr. Bessemer's patent. We have no hesitation in saying that the annulling of a patent once granted, or the refusal to grant a patent, upon the ground that some person in some remote age made experiments involving the principles contained in the patent granted or applied for, is adopting a most dangerous and unjust principle, and one which cannot fail to be productive of the most baneful consequences. There is one gratifying circumstance attending this annulling of Mr. Bessemer's patent, which is this, that the American press seems ashamed of it, for it has stated its conviction of the necessity for reform in this respect, and that a certain time only should be allowed to elapse after a discovery or invention has been made, during which the discoverer or inventor should obtain a patent or else loose the right of doing so, and that if he eventually gives up the idea of applying for a patent, his experiment being made should be no bar to another person, native or foreigner, obtaining a patent for the same thing, provided it be a *bona fide* invention. There can be no doubt that this is a just view of the case, and we are very glad to find that if American inventors are ignorant of what is right, they cannot plead ignorance in the future. In another column will be found the remarks of our scientific cotemporary upon this subject, and we trust that they will not be the only ones made in Mr. Bessemer's behalf. We should very much like to know the exact meaning of an original or first inventor, or how it is possible to ascertain whether an inventor is an original one or not; further, we should like to know whether there are any cases on record of an American inventor having obtained a patent, and of his patent having been annulled by the discovery that drawings of his invention were made by somebody else eight years before. We would almost undertake to say that the American Commissioner of Patents could point to no such case. We are not disposed to be too harsh, nor do we wish uncharitably to interpret the decision of the American Commissioner of Patents, inasmuch as it would appear clearly to be American law that one patentee can supersede another, if he can succeed in fishing up a few old drawings, and getting a few persons to swear that what was just patented was nothing more than what their friend did eight years before. It is stated in this case that Mr. Kelly's testimony appears to be reliable in every respect, and for the sake of American inventors we hope it is; but we cannot help condemning, in the strongest terms, the principle upon which Mr. Bessemer's patent has been annulled. We think it would be well for those who have the interest of American inventors in their keeping, to show what precedents there exist of patents being annulled after the lapse of so long a time; otherwise we much fear that, on this side of the Atlantic, many will suspect that the case in point is the first of its kind. For our own part we sincerely hope it is not."

In reply to the above, we desire to say that it has been the uniform practice of the U. S. Patent Office, since its establishment, to grant patents to the original and first inventor; it matters not to what clime or nation he may belong. In pursuing this old practice in the case of Kelly *vs.* Bessemer, the American Patent Office only obeyed the high requirements of the law, without regard to Mr. Bessemer's nationality. Therefore, the *Engineer* betrays inexcusable ignorance when it says that "if American inventors are ignorant of what is right, they cannot plead ignorance for the future." American inventors are not responsible for the good or bad character of our Patent system. They had no more to do with its framing than Dick Turpin had to do with the preparation of the *Westminster Catechism*; and to brand them with ignorance of what is right, or to hold them responsible for the defects which are known and severely felt by them to exist in the workings of the American Patent law, is as destitute of justice as it would be to accuse English inventors of inciting the Sepoys to their recent rebellion. Unfortunately, our Congress is made up of politicians who seemingly care but little for inventors, any way.

The present Patent laws were enacted more than twenty years ago, and, although defective in some respects, they will yet bear comparison with those of any other country. In fact, they are superior to the English Patent law of 1852, or the one which preceded it, inasmuch as our laws recognize the legal and moral rights of the first inventor, and do not hold out the slightest encouragement to outside parties to steal and patent inventions not their own.

Mr. Bessemer has not been defrauded of his invention by any trickery on the part of the American Commissioner of Patents. He carefully weighed the facts elicited in the evidence offered by each party; and if our cotemporary has any curiosity to examine the testimony, copies can be obtained from the records of our Patent Office, just the same as in the case of any other legal proceeding. A question of priority between the applicants is always a question of *fact*, and is ascertained by testimony to which both parties contribute. The above case is not an uncommon one; we occasionally meet with similar ones in our professional experience; and as *law*, the Commissioner of Patents has no other alternative but to obey it, until Congress (not American inventors) shall amend the same.

Two years since, when discussing the proposed changes in the American Patent system, we took decided ground against the existing law and practice on the subject of priority of invention, and also against that clause in the law which discriminates in reference to the fees to be paid by citizens and foreigners. On these two points, we entirely agree with our cotemporary, for we are unwilling to encourage the slightest shadow of unfairness in such matters.

Coal-Breaker Patent Extended.

We are informed that the Commissioner of Patents has extended Battins' coal-breaker patent for a term of seven years. This patent has been the subject of considerable litigation, and this announcement will unquestionably stir up a hornet's nest among some portion of the coal interests.

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Correspondents

THE ATLANTIC TELEGRAPH CABLE—Since the breaking of the cable we have received a great number of communications about it from our readers—enough, probably, should we give place to them, to fill one entire number of our paper. Not desiring to show any preference, we will state that they all tend to the same result, namely, that the cable be buoyed up during the paying out, and the difference between each only consists in the method of effecting this result; some propose an india rubber tube, others bladders, others a large floating buoy, &c., while many propose most impracticable schemes. We are glad that so much interest has been excited among our correspondents on this subject, as we are happy to receive and read communications from them on scientific subjects. Our only regret is, that we do not more frequently hear from the various workshops of our country.

D. R., of N. C.—You may safely keep either alcohol or spirits of turpentine in zinc cans, if the cans be clean and free from blackness or rust in the interior before the liquids are put in, as neither of them have any affinity for zinc, and will not "eat" it away. We are much obliged to you for the flattering manner in which you speak of us, and for the method you have taken of showing your appreciation of our paper, viz., by extending its circulation.

C. L., of Ohio.—The only way of cleaning a bust cut in freestone, which has been badly stained with soap, is by washing repeatedly with a soft brush and clean tepid water until the whole is dissolved out; but if it has been left in too long, it may have permeated through the whole of the stone, and you could not extract it at all without, perhaps, leaving it worse than it is at present.

W. A. C., of Wis.—We know of no liquid that can be colored red that will float on alcohol without mixing, and that will move freely in the containing vessel without becoming united. Such a liquid would be a desideratum.

H. B., of Ind.—The method usually adopted for sharpening the blades of cloth-cutters in Yorkshire, Eng., is by a common hand hone, but you might do it in a lathe, provided you are very careful, and keep the cutting edge quite straight. There is no English journal devoted to the machinery of the woolen manufactures, but we think you would find all the novelties in either the *Artizan*, the *Mechanics' Magazine*, or the *Engineer*.

M. B., of N. Y.—The method we adopted of ascertaining the pressure of a given number of atmospheres is simply multiplying them by fifteen, that being the number of pounds to the square inch with which one atmosphere presses against any body. Although the volume varies on account of the elasticity of gases, the pressure does not. Our conclusions were deduced from the experiments of many able philosophers.

R. M. E., of N. C.—The American sumac is very seldom used for tanning. Nearly the whole used in this country is imported from Sicily. Should you, however, wish to try home-grown, you must cut it when young and full of sap, and use only the berry. It must be dried in the shade, as the sun will spoil it.

W. H. E., Ind.—We should be glad of some further particulars of the phenomena you mention, when we may be able to give our opinion.

J. R., of Ohio.—We have received your communication on maple sugar, and feel glad that you have succeeded in granulating it by simply boiling.

L., of Cal.—Postage stamps are gummed by means of a hand brush, which lays on the gum tragacanth or arabic, the latter being the most usually employed.

J. W. B., of Pa.—We do not know of any manufacturer of calcined silica in the United States, but perhaps some of our correspondents may do so, and they will kindly give us the information.

W. G., of Mass.—Your theory of the passage of electricity through the Atlantic cable we do not think correct. We publish this week an article on this subject entitled "Electricity."

A. H., of Wis.—The best method you can adopt to preserve meat fresh is by placing it in hermetically sealed cans, having first expelled all air, by packing it while the cans are in hot water, and soldering up immediately.

G. W. F., of Wis.—The subject of the divining rod or dowsing fork having been fully discussed in this journal, we do not wish again to enter into it, as it has lost its interest to our readers.

S. O. M., of N. Y.—Such a machine for laying a telegraphic cable over a plain or prairie, by digging a furrow for it to lie in, would not be patentable, without you have some new and material modification in the machinery, as such machines have been used in this country, and are common in England, where they are used for digging drains and laying hollow train tiles in the ground. They perform all the operations you mention—neatly dig the furrow, lay the tiles, and cover them up, leaving the surface level and compact.

Money received at the Scientific American Office on account of Patent Office business, for the week ending Saturday, September 26, 1857:—

A. G. A., of Ill., $30; G. S., of Pa., $30; J. H., of Ill., $25; E. D., of La., $25; G. W. D., of N. Y., $25; D. G., of R. I., $30; J. R., of La., $20; F. & Co., of N. Y., $100; A. H., of N. Y., $30; W. S. W., of L. I., $10; P. & C., of Ohio, $30; J. E. N., of N. Y., $30; L. A. C. B., of Ill., $30; H. S. B., of N. Y., $25; E. R., of L. I., $30; E. L. T., of Pa., $25; E. P. R., of N. Y., $25.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Sept. 26, 1857:

H. S. B., of N. Y.; J. H., of Ill.; E. R., of L. I.; E. L. T., of Pa.; G. W. D., of N. Y.; A. G. A., of Ill.; E. H. D., of Ohio; C. & C., of N. H.; E. P. R., of N. Y.

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Science and Art.

Temperature of Liquids.

The temperature of any liquid, not in a state of equilibrium, varies with the depth. For instance, if a thermometer be introduced at different depths, in warm or cold water, provided the water has not attained a settled temperature, it will indicate different degrees of heat, falling as it descends. This, of course, results from the law, according to which the density varies with the temperature, and depends upon the unequal rate at which different portions of a liquid gain or lose heat. Every practical chemist, aware of this fact, endeavors to obviate all errors which may arise from it by stirring any liquid which is warming, or cooling, before he introduces a thermometer to ascertain its temperature.

Fee's Improved Cotton Seed Huller.

The ordinary cotton seed hullers subject the seed to a grinding action, which so packs the hulls, fibres, and kernels together that it is impossible to separate them in the process of screening. The grinding action sometimes form rolls, which are held together by the cotton fibers. When grooved cylinders are employed, the grooves usually fill as they pass under the opposing concave, and remain full until they again emerge from the concave, when the crushed seed falls in lumps. It not unfrequently happens that hulling mills choke up so as to require separation of the parts for cleaning, and it is found to be utterly impossible to hull damp seed. This very defective mode of hulling renders the subsequent screening imperfect and occasions a great loss of oil. Some of the oil being expressed by the grinding action is absorbed by the porous hulls and the fibers of cotton, and lost in the screening. Another portion is wasted in the fragments of kernels, which are screened out with the hulls.

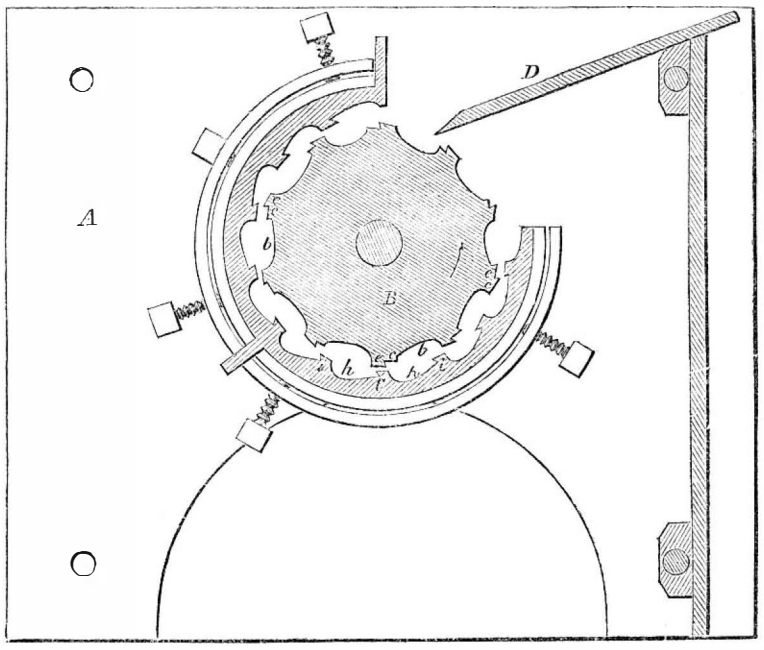
The object of the invention here illustrated is to overcome the above-mentioned difficulties, by cutting the seeds open in such a manner that the divided kernels fall clean from the hull, having cut surfaces to which neither the cotton fibers nor hulls will adhere, consequently the screening process can be perfect.

The invention consists of cutting edges with deep intervening furrows, which will hull the seed by a clear cut, instead of a grinding or crushing action.

In the engraving, A represents any convenient frame for supporting the cylinder, B, and concave, C. The cylinder, B, is armed with a series of cutting edges, *e*, between each two of which is a deep furrow, *b*. The concave, C, is in the same way armed with a series of cutters, *i*, and intervening furrows, *h*. The cutting edges, *e*, on the cylinder, B, are set in an opposite direction to those upon the concave. The deep furrows, *b* and *h*, are very steep on one side, whilst the other is a gradually inclined plane, so that the seed may ride up to the cutting edges. In the furrows upon cylinder B there is a small ledge, *c*, having a file edge, which catches the fibers on the cotton seed and carries the seed into the huller just in the position to receive the stroke of the first cutting edge upon the concave. Another effect of the file edge rib is to prevent the seed from budging as it is fed into the huller from the board. The cylinder revolves in the direction shown by the arrow.

As the cutting edges of the cylinder pass those on the concave, the seeds are cut completely open—one part of each seed being carried forward by the cutting edges of the cylinder, and the other part being knocked backward by the edges on the concave. When the seed are thus cut open, the force of the blow and consequent recoil of the hull by its own elasticity throws most of the kernels out of the hulls. The stroke of the huller also drives the broken seed violently against the sides of the deep furrows, so as to complete the operation of knocking all the kernels out of the hulls. That portion of the seed which passes the first stroke of the concave uncut, has a tendency to ride up the inclined planes of the furrows until the seeds are caught by the succeeding cutting edges. This tendency of the seeds to the cutting edges is produced in part by the reversed position of the two sets of inclined planes, and in part by the gravitation

FEE'S COTTON SEED HULLER.



of the seeds, but chiefly by the action of the air, to which a whirling and sucking action is given by the motion of the cylinder. In working the machine, the high speed of the cylinder drives the seed through so fast that choking is believed to be impossible.

This machine was patented August 11, 1857. The patentee and inventor, W. R. Fee, will give any more information concerning it by addressing him at Cincinnati, Ohio.

MASSEY'S LEAKAGE ALARM GAGE FOR SHIPS.

Fig. 1

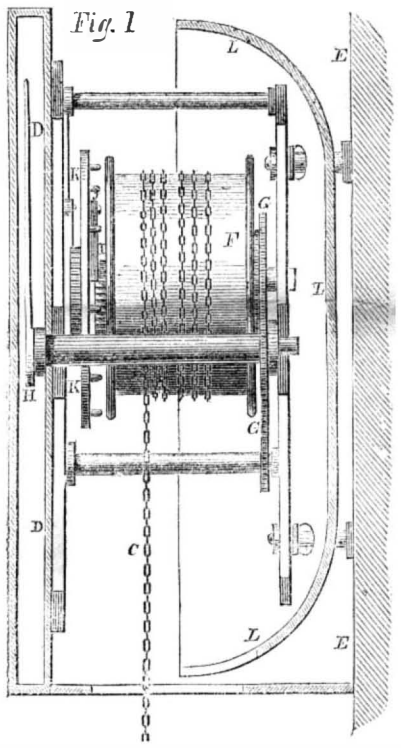
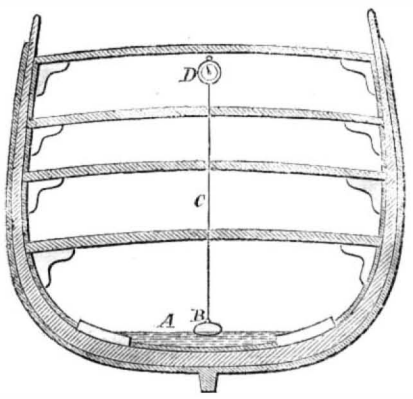


Fig. 2



In trusting our lives as daily we do in steamers, ships, and vessels of all kinds and sizes, on oceans, lakes and rivers, we cannot take too many precautions against accidents; and any means whereby we can be forewarned of danger is a blessing to the whole maritime community. One of the most common accidents to which a ship is liable is leakage, and by not knowing in time the exact amount of water in the hold, many good ships and cargoes, and many more valuable human lives have been lost.

The apparatus shown in the accompanying engravings is designed to lessen this risk to a considerable degree, and is the invention of Gideon B. Massey, of Mobile, Ala., and was patented Aug. 11, 1857. It is simple in its construction, and not liable to get out of order.

Fig. 2 is a section of a ship having the apparatus hanging under the deck. A is the well-hole of the ship, in which there floats the float B; this is attached to the cord or chain, C, that passes round the barrel of the apparatus and dial, D. Fig. 1 is a vertical section of the alarm and indicating arrangement. E is a strong frame to which the parts are attached. C is the chain that communicates with the float, and is formed round the drum, F, in the interior of which a spring is coiled, and being made fast to an arbor in the center, it will not move. It is capable of turning the drum, but it is kept from doing so by the tightness of the chain that holds it at rest, when, however, the water rises in the hold of the ship, the float, of course, rises with it, and loosening the chain, allows the barrel to revolve. As it does so, it moves a train of wheel work, G, which, connecting with a finger, H, indicates on dial, D, the number of feet that the water has risen.

There is also an alarm apparatus connected with the barrel that acts in the following manner:—I is a ratchet wheel connected with the barrel, moving with it. J is a pawl holding it at rest, and secured to the wheel, K, in the rim of which there are a number of pins at regular intervals projecting inwards, and this is so arranged that when the chain becomes slack, and the barrel rotates for each foot of chain slackened, the barrel and ratchet wheel move the wheel, K, such a distance that for every foot a peg shall lift the end of a hammer (not seen in our engraving) which strikes the bell, L, and thus sounds an alarm. The teeth of the ratchet are arranged at such an angle that when the chain is pulled to be wound up or to bring the float again on the level of the water, it moves freely under the pawl, J, and does not move the peg wheel, K.

This invention, should it answer all the purposes claimed for it by the inventor, (who is a nautical man by profession,) cannot be too highly estimated, as wherever there are vessels at sea, or on our rivers, or in our docks, they ought each to be provided with a gage, or rather one to each well-hole, and such an arrangement would add considerably to the safety of passengers and crew.

For further particulars, address the inventor, as above.

Literary Notices.

SOUVENIRS OF TRAVEL. By Madame Le Vert. S. H. Goetzel & Co., New York. This book has been almost spoiled by the publishers' preface, which is one mass of foolish puffing, and had better be left out in the next edition. Madame Le Vert is just the traveler whom one likes to accompany on a long tour. She leaves us to search in common itineraries for solid information on the places she has visited, and gives us but the impressions which the people she met and sights she saw left on her mind, and certainly they are pleasant impressions, and are so well told that we read them with delight. She has traveled in lands of superlatives, and nothing but most beautiful ladies, elegant and courteous gentlemen, and grand sights has she seen; but still it is a light, pleasant book of travel, and we only wish that wherever we go we may be blessed with the happy eyes and appreciative genius of the authoress.

THE AMERICAN RAILWAY TIMES, edited and published by John A. Haven, Boston, Mass., is a most excellent journal, high toned, reliable, and sound upon the various topics in connection with railway and general engineering interests. We have had frequent occasion to extract articles from its columns of much practical interest.

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VOLUME THIRTEEN.

TO MECHANICS, MANUFACTURERS, INVENTORS AND FARMERS.

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